

### **Prior Art-based Rejections**

Claims 17-19 are rejected under 35 U.S.C. 102(b) as being anticipated by EP 0 807 989 A1.

Claims 1-4 and 6-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over United States Patent No. 6,351,499 issued to Paulraj et al. on February 26, 2002 in view of United States Patent No. 5,982,327 issued to Vook et al. on November 9, 1999.

These grounds of rejections are avoided for the following reasons.

As noted in the Office Action, applicants previously argued that all of their claims that are rejected based on prior art recite the use of interference covariance matrix to compute the weights. However, none of the cited references teaches to employ an interference covariance matrix in computing the weights. Applicants also noted that some of the references compute the covariance matrix of signals. Applicants stated that the covariance matrix of signals is quite different from the interference covariance matrix.

However, the current Office Action, in response to this argument, states that the prior art already teaches applicants' recited limitation, i.e., the prior art teaches to employ an interference covariance matrix in computing weights. This is based, according to the Office Action, on giving the limiting term "interference covariance matrix" its broadest reasonable interpretation, since the term is not defined in the specification. Apparently then, according to the Office Action's interpretation, the term "interference covariance matrix" of applicants' claims can include the "covariance matrix of signals" taught in the prior art.

The Office Action's analysis and conclusion are, quite simply, incorrect.

Applicant's note that the term "interference covariance matrix", a.k.a., "covariance matrix of interference", and the term "covariance matrix of signals" are terms of art, and more specifically, terms of basic mathematics as applied to MIMO communications systems. As such, "covariance matrix of signals" as used in the references cannot be defined to include the limitation of "interference covariance matrix" as recited in applicants' claims. This can be clearly seen from the following basic explanation.

Mathematically, every random vector has a covariance matrix associated with it. The covariance matrix is for a vector what the variance of a random scalar, i.e., they are analogous concepts. More specifically, the  $i,j$  entry of the covariance matrix indicates the cross-variance between the  $i^{\text{th}}$  and the  $j^{\text{th}}$  entries of the vector to which the covariance pertains.

In MIMO communication systems, the signal, i.e., the desired information, and the interference, i.e., the stuff that causes the signal to be degraded, are, naturally, separate items and each is represented by a distinct vector. Therefore, each of the signal vector and the interference vector has associated with it its own respective covariance matrix. In other words, there is a covariance matrix for the signal, known as the signal covariance matrix and there is a covariance matrix for the interference, known as the interference covariance matrix. Thus, notwithstanding the Office Action's suggestion to the contrary, clearly, the signal covariance matrix and the interference covariance matrix are different quantities. This fact has nothing to do with whether or not the applicant is being his own lexicographer, as these are simply standard, well-known terms, based on the mathematics being employed, and they are being used as they are ordinarily used in the art.

Clearly then, the two terms cannot be simply substituted for one another. One relates to the signal, which is good, the other to the interference, which is bad. Furthermore, use of one does not suggest use of the other. In fact, the cited references do not treat the interference as a vector, but instead, simplify its representation to be a scalar. Thus, the references at best have covariance matrix of signals, but they do not have an interference covariance matrix. Nor is the use of an interference covariance matrix obvious from the use of a scalar to represent interference. Indeed, even if it were suggested, which it is not, employing the interference covariance matrix is not simple, nor is it a straightforward substitution of a matrix for a scalar.

Thus, applicants use of the interference covariance matrix, and recitation of same in the claims, renders applicants' invention as claimed patentable over the cited references.

In regard to applicants' prior statement that all of the cited references are limited to environments where the noise is considered to be white noise, the Office Action appears to be looking for some sort of explicit claim language with similar verbiage. Not having found such language, the Office Action states that there is no such distinguishing limitation in the claims. However, applicants note that it is the use of the interference covariance matrix that allows the invention to be employed in an environment in which the noise is not white, and use of the interference covariance matrix is indeed recited in applicants' claims. Applicants in their previous response were simply pointing out a distinguishing advantage that results from the invention as claims.

Thus, all of applicants' claims are allowable over the cited references, individually or in combination.

**Conclusion**


It is respectfully submitted that the Office Action's rejections have been overcome and that this application is now in condition for allowance. Reconsideration and allowance are, therefore, respectfully solicited.

If, however, the Examiner still believes that there are unresolved issues, he is invited to call applicant's attorney so that arrangements may be made to discuss and resolve any such issues.

In the event that an extension of time is required for this amendment to be considered timely, and a petition therefor does not otherwise accompany this amendment, any necessary extension of time is hereby petitioned for, and the Commissioner is authorized to charge the appropriate cost of such petition to the **Lucent Technologies Deposit Account No. 12-2325**.

Respectfully,

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